

<<分离工程>>

图书基本信息

书名：<<分离工程>>

13位ISBN编号：9787122129109

10位ISBN编号：7122129101

出版时间：2012-3

出版时间：化学工业出版社

作者：徐东彦，叶庆国，陶旭梅 编

页数：256

字数：440000

版权说明：本站所提供下载的PDF图书仅提供预览和简介，请支持正版图书。

更多资源请访问：<http://www.tushu007.com>

<<分离工程>>

前言

教育部关于《加强高等学校本科教学工作提高教学质量的若干意见》以及《进一步加强高等学校本科教学工作若干意见（征求意见稿）》均提出本科教育要创造条件使用英语等外语进行公共课和专业课教学。

此外，《普通高等学校本科教学工作水平评估指标体系》中也对双语教学有明确要求。

由此可见，双语教学是我国高等教育与国际接轨和教育改革发展的必然趋势，也是当前教学改革的重点和热点。

分离工程是化学工程学科的重要分支，是研究各种化学物质的分级、分离、浓缩和纯化的方法、工艺、材料、设备等方面的过程工程科学。

化工分离过程在现代化学工业和相关工业领域中应用广泛，地位十分重要。

在大力倡导节能减排、资源高效利用和绿色化工的21世纪，化工分离技术将在石油化工、资源环境、能源、材料等诸多领域发挥更为重要的作用。

随着化学工业的飞速发展，新型化工分离技术已经成为化工领域研究的热点。

众所周知，当今世界已经进入知识大爆炸时代，科学技术与知识日新月异，其中绝大部分新成果都需要通过英文报道。

目前，国际上有关分离工程与科学的专业期刊有Journal of Separation Science, Journal of Membrane Science, Journal of Membrane Biology, Separation and Purification Technology, Separation & Purification Reviews, Adsorption Science & Technology, Filtration & Separation, Solvent Extraction & Ion Exchange, Molecular Membrane Biology等。

为追踪国际上有关分离理论与技术的研究热点，需要阅读大量相关专业期刊和专利，这就要求相关研究人员能熟练掌握和运用有关分离科学与工程专业英语。

因此，作为化工类专业及其相关专业的一门骨干专业课程，开展《分离工程》的双语教学具有重要意义。

一本适合双语教学的好教材是正常开展双语教学及保证教学效果的基础。

国外原版教材在语言上原汁原味，但在内容上却未必完全符合我国的教学要求。

原版教材存在的主要问题是内容较多、篇幅巨大且知识点跨度较大，很难在有限学时内学习使用。

如果能与现有中文教材相对照编写双语教材则更便于学生掌握相关英文专业术语与内容，还可以在有限学时内掌握相关专业知识，更适宜于双语教学需要。

为此，我们在编写、出版《分离工程》中文教材的基础上，编写了《分离工程》（英文版）教材。

本书内容共分七章，分别介绍多级平衡分离基础、精馏、多组分吸收、多级分离的严格计算、分离过程设备的效率和过程优化、其他新型分离方法等内容。

每章后有词汇、注释、习题与参考文献，便于学生学习参考。

本书由青岛科技大学的徐东彦副教授、叶庆国教授和陶旭梅博士编写。

其中第1章、第2章、第6章和第7章由徐东彦编写，第3章和第4章由叶庆国编写，第5章由陶旭梅编写。

最后，感谢博士研究生刘永卓、硕士研究生王海振、卢鹏、胡鸿宾、宋红荣、席玉蕾、孙晋良和程世超等在资料收集过程中提供的帮助。

由于编写人员水平有限，书中不妥之处在所难免，衷心希望广大读者和有关专家学者批评指正。

编者 2011年10月

<<分离工程>>

内容概要

《分离工程(英文版)》是针对分离工程双语教学编写而成的英文版教材，内容编排与中文分离工程课程体系一致，便于学生学习使用。

本书共七章，内容包括多级平衡分离基础、精馏、多组分吸收、多级分离的严格计算、分离过程设备的效率和过程优化、其他新型分离方法等。

每章后附有词汇、注释、习题与参考文献。

本书编写时参考了大量英文原版教材与英文文献，力求语言上达到原汁原味。

《分离工程(英文版)》可作为高等院校化学工程与工艺、制药工程、生物工程、环境工程、食品与轻化工等专业的分离工程双语教材，也可作为相关科研人员和技术人员的参考书。

<<分离工程>>

书籍目录

Chapter 1 Separation Processes

1.1 Characteristics of separation process and separation factor

1.1.1 Characteristics of separation process

1.1.2 Separation factor

1.2 Classifications of separation process

1.3 Selection of separation processes

1.4 Industrial chemical processes

Words

Notes

Problems

References

Chapter 2 Foundation of Multicomponent, Multistage Separations

2.1 Degree of freedom and design variables

2.1.1 General description

2.1.2 Design and control degrees of freedom

2.1.3 Phase rule and the degree of freedom analysis of processes

2.2 Calculation of phase equilibrium

2.2.1 Phase equilibrium

2.2.2 Phase equilibrium data

2.2.3 Calculations of vapor – liquid equilibrium

2.3 Multicomponent bubble- and dew-point calculations

2.4 Single stage equilibrium calculations

2.4.1 Determination of phase conditions for a mixture and types of flash

distillation calculations

2.4.2 Isothermal flash

2.4.3 Adiabatic flash

2.5 Batch distillation

2.5.1 Introduction

2.5.2 Unconventional column configurations

2.5.3 Batch distillation optimization

2.6 Steam distillation

2.7 Continuous distillation

Words

Notes

Problems

References

Chapter 3 Multicomponent, Multistage Separations

3.1 Multicomponent distillation

3.1.1 Key components

3.1.2 Complex of multicomponent distillation

3.2 Fenske-Underwood-Gilliland shortcut method

<<分离工程>>

- 3.2.1 Material balance method of sharp separation
- 3.2.2 Fenske equation for minimum equilibrium stages
- 3.2.3 Underwood formula for minimum reflux ratio
- 3.2.4 Gilliland correlation for actual reflux ratio and

theoretical stages

- 3.2.5 Feed-stage location
- 3.3 Azeotropic distillation
 - 3.3.1 Azeotropism
 - 3.3.2 Characteristics of azeotrope
 - 3.3.3 Azeotropic distillation processes
 - 3.3.4 Azeotropic distillation using an entrainer
- 3.4 Extractive distillation
 - 3.4.1 Introduction
 - 3.4.2 Principles of extractive distillation
 - 3.4.3 Analysis of extractive distillation process
- 3.5 Salt distillation

Words

Notes

Problems

References

Chapter 4 Gas Absorption and Stripping

- 4.1 Introduction
- 4.2 Gas-liquid equilibrium
 - 4.2.1 Equilibrium of physical absorption
 - 4.2.2 Equilibrium of chemical absorption
- 4.3 Absorption and stripping process
 - 4.3.1 Introduction of absorption and stripping process
 - 4.3.2 Analysis of multicomponent absorption and stripping

process

4.4 Shortcut calculation of multicomponent absorption and stripping process

- 4.4.1 Basic conception of absorption process calculation
- 4.4.2 Absorption factor method
- 4.4.3 Stripping factor method

Words

Notes

Problems

References

Chapter 5 Rigorous Methods for Multicomponent, Multistage Separations

- 5.1 Theoretical model for an equilibrium stage
 - 5.1.1 Physical model of complex distillation column
 - 5.1.2 Theoretical model of equilibrium stage
- 5.2 General strategy of mathematical solution
- 5.3 Equation-tearing procedures
 - 5.3.1 Tridiagonal-matrix algorithm
 - 5.3.2 Bubble-point (BP) method

<<分离工程>>

5.3.3 Sum-rates (SR) method

5.3.4 Simultaneous-correction method

5.4 Stage-by-stage method

5.4.1 Starting point of calculation

5.4.2 Calculation at constant molar overflow

5.4.3 Determination of feed stage and the criteria for the end of calculation

5.4.4 Calculation at varying molar overflow

Words

Notes

Problems

References

Chapter 6 Efficiency and Energy Saving in Distillation

Process

6.1 Efficiency

6.1.1 Types of plate efficiency

6.1.2 Factors impacting efficiency

6.1.3 Efficiency calculation methods

6.1.4 Overall efficiency evaluation of commercial distillation columns

6.2 Minimum work of separation process

6.2.1 General description

6.2.2 Minimum work of separation

6.2.3 Nonisothermal separation and available energy

6.2.4 Net work consumption and thermodynamic efficiency

6.3 Energy saving in distillation process

6.3.1 Thermodynamic analysis of separation process

6.3.2 Distillation with intermediate condenser and reboiler

6.3.3 Multi-effect distillation

6.3.4 Heat pump

6.4 Distillation sequencing

6.4.1 Distillation sequencing using simple columns

6.4.2 Practical constraints restricting options

6.4.3 Choice of sequence for simple nonintegrated distillation columns

6.4.4 Distillation sequencing using columns with more than two products

6.5 Synthesis of separation processes by case-based reasoning

6.5.1 Selection of single separations

6.5.2 Synthesis of azeotropic separations

6.5.3 Synthesis of separation sequences

6.5.4 Combined operations

6.5.5 Examples on azeotropic separation

6.6 Design and optimization of thermally coupled distillation schemes

6.7 Energy efficiency of an indirect, thermally coupled

<<分离工程>>

distillation sequence

Words

Notes

Problems

References

Chapter 7 Other Separation Methods

7.1 Adsorption

7.1.1 Adsorbents

7.1.2 Fundamentals of adsorption equilibria

7.1.3 Theories of adsorption equilibria

7.1.4 Processes and cycles

7.1.5 Application in carbon dioxide separation

7.2 Ion exchange

7.2.1 Structure of ion exchange resins

7.2.2 Principles of ion exchange processes

7.2.3 Type of ion exchange resins

7.2.4 Application of ion exchange resins

7.2.5 Regeneration of ion exchange resins

7.3 Liquid-liquid extraction

7.3.1 Solvent selection

7.3.2 Extractor design

7.3.3 Liquid-liquid extraction equipment

7.3.4 Supercritical fluid extraction

7.4 Reactive distillation

7.4.1 Introduction

7.4.2 Basic of reactive distillation

7.4.3 Available commercial catalytic packings and homogeneous

internals

7.4.4 Barriers to commercial implementation

7.4.5 Computational methods

7.4.6 Application

7.5 Membrane separation

7.5.1 Introduction

7.5.2 Membranes for gas separation

7.5.3 Membranes for liquid separation

Words

Notes

Problems

References

章节摘录

版权页：插图：Centrifugal extractors are ideal for systems in which the density difference is less than 4%. In addition, this type of system should be utilized if process requires many equilibrium stages. In these systems, mechanical devices are used to agitate the mixture to increase the interfacial area and decrease mass transfer resistance. Centrifugal contactors, like mixer-settlers, are discrete stage units, providing one stage of extraction per unit and are readily linked together as each rotor pumps separated fluids to the next stage inlet in each direction. The primary difference between a centrifugal contactor and a mixer-settler is the separation of the two phase mixture. Centrifugal contactors employ a spinning rotor that intensely mixes the two phases and separates the two phases inside the rotor where the centrifugal forces can be as high as 300g, resulting in efficient and fast phase separation. The separated phases exit the contactor by overflow and underflow weirs, similar to a mixer settler.

<<分离工程>>

编辑推荐

《分离工程(英文版)》是高等教育双语教学推荐教材之一。

<<分离工程>>

版权说明

本站所提供下载的PDF图书仅提供预览和简介，请支持正版图书。

更多资源请访问:<http://www.tushu007.com>